

Petroleum in Bahrain: in the Kingdom of “Two Seas”

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Abstract

The past, current status and future of the oil and gas sector of Bahrain are considered and analyzed. The author uses methods of comparative and systematic analyses, which are implemented for assessing the Bahraini hydrocarbons in the context of the world, the Middle East, and the Persian Gulf area. The article mainly concludes that the Covid-19 pandemic has seriously hit the Bahraini oil market (harder than the other sectors of the national economy), however, the pandemic has made inland oil demand and petroleum imports of the kingdom lower but the domestic crude oil production will unlikely increase in the foreseeable future above 200 kb/d, despite the significant discovery of HCs announced by Bahrain’s officials in early 2018.

Key words: Crude oil; Natural gas; History; Production; Petroleum companies; Bapco; Oil refining; Consumption; Foreign trade; Bahrain

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Bahrain is a small island kingdom in the Arabian/Persian Gulf, the second (after the UAE) richest in terms of per-capita GDP (PPP) amongst the Arabic countries (in line with the IMF’s data for 2022 – US\$57,424 per capita). According to the country’s Information & Government Authority, the oil and gas sector was the largest contributor to GDP produced by Bahrain in 2019 – 17.8%^[1] and, at present, receives more than three quarters of its government revenues from the oil and gas. Oil, in particular, is Bahrain’s most exported product, accounting for 60% of export receipts, 70% of government revenues, and 11% of GDP. In 1970 the kingdom joined the Organization of Arab Petroleum Exporting Countries (OAPEC), established in 1968.



Reserves. Bahrain’s crude oil (including lease condensate reserves) were estimated, according to the US’ Knoema World Atlas, at level of 161.13 mln bbl as of January 2022, down from nearly 220 mln bbl at the start of 2020 and 124.6 mln bbl as of the beginning of 2018^[2].

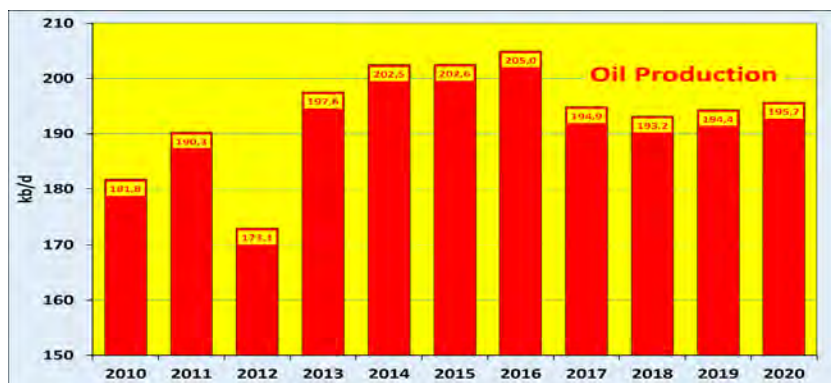
In early April of 2018, Bahrain’s Oil Minister Sheikh Mohammed bin Khalifa Al Khalifa has announced the country’s largest discovery of hydrocarbon deposits since 1932. The deposits are in the shallow waters of the Khalij Al-Bahrain Basin and have been independently assessed to be around 80 billion barrels of shale (or tight) oil and 10 to 20 trillion cubic feet of deep natural gas, on a P50 basis. Found off Bahrain’s west coast, if it is verified

by an international oil consortium as being technically and economically recoverable it could be a boon for the nation’s economy^[3].

Bahrain’s reserves of natural gas were estimated at level of 2.87 trillion cubic feet in the middle of 2021, down from 6.8 TCF in the mid of previous year, a change of 57.8%^[4].



Production. In line with the London-based Ceic Data, Bahrain’s annual oil (crude oil + lease NGLs) production grew from 182 kb/d in 2010 up to 205 kb/d 2016, declined to some 193 kb/d in 2018 and rose up to nearly 196 kb/d in 2020 (Fig. 1).



Source: drawn by the author based on <https://www.ceicdata.com/en/indicator>^[5]

Figure 1
Crude Oil (including lease NGLs) Production in Bahrain in 2010-2020 (according to Ceic Data), in kb/d

The small non-OPEC Gulf oil producer gets its oil revenue from two fields: the onshore Bahrain/Awali field, and the offshore Abu Safah field, which is shared jointly (50:50) with Saudi Arabia. The crude oil from the Abu Safah field is not refined in Bah-rain and is only used by the country in the raw form for export.

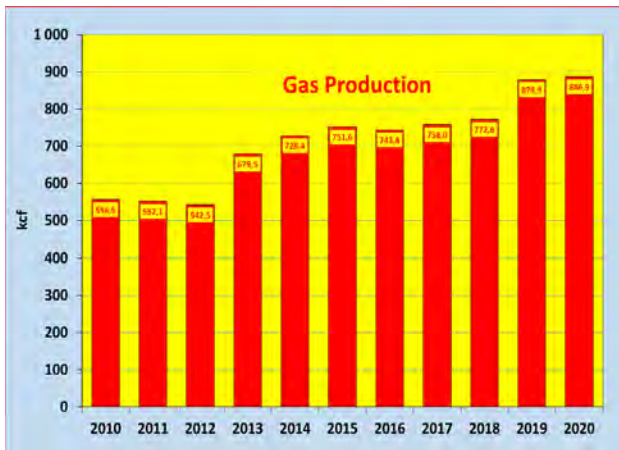
In fact, in between 82 and 88% of the crude oil, which is produced at this field, is officially possessed by Bahrain under an agreement with Saudi Arabia.



Since December 2017 the Kingdom of Bahrain and

some other oil-producing non-OPEC countries adjusted their respective oil production, voluntarily or through managed decline, in the support of the supply restrictions agreed by the OPEC and its allies (the so-called OPEC+ deal) in the effort to anchor plummeting oil market prices. Furthermore, in December 2019 the kingdom pledged to cut its crude oil output by 2 kb/d in the first quarter of 2020 (very symbo-lical but still very important!). In early August of 2020, Bahrain (together with the Gulf Cooperation Council’s (GCC) other 5 member countries, including Oman) voiced its position by approving a provisional cut in output of 600,000 barrels per day imposed by OPEC and its allies in their fight against the pandemic.

In its turn, Bahraini natural gas production was more steady and grew from 557 kilo cubic feet in 2010 up to nearly 887 kcf in 2028, including almost 277.38 kcf of as-sociated gas (Fig. 2).



Source: drawn by the author based on <https://www.ceicdata.com> [6]

Figure 2
Natural Gas (both free and associated) Production in Bahrain in 2010-2020 (according to Ceic Data), in kilo cubic feet

Companies. At present (2022), there are over 38 foreign and local oil- and gas-related companies, including such world-famous names like Occidental, Chevron, Mubadala, Weatherford, and Petrofac operating in upstream and downstream sectors of Bahrain.

It is noteworthy that the IOCs are not involved in full-fledged business in Bahrain, with this sector being fully managed by over 14 small-sized local firms and Bapco with its related subsidiaries (*see below*).

In the latest of a series of moves designed to incentivize and facilitate current and future foreign investment by oil and gas companies, the Government of Bahrain has announced in June 2019 that it would now allow foreign companies to own 100% of oil and gas drilling activities in Bahrain. The announcement came on the back of other incentivisation schemes, following the large discovery in the shallow waters of the Khalij Al-Bahrain Basin in 2018 (*see above*).

The Bahrain Petroleum Company (BAPCO)'s inception in 1929 marked the start of a radical transformation whose impact was felt in Bahrain, the Middle East and across the world.



Bapco, an integrated petroleum company, is wholly owned by the Government of Bahrain and accounts for a massive portion of energy-related activities; primarily refining, distribution of petroleum products and natural gas, sales and export of crude oil and refined products among others. Bapco has been recognized as one of the main architects of modern Bahrain because of the company's pioneering role as the first oil company in the Arabian/Persian Gulf to export oil. Nowadays, Bapco along with its affiliates remains one of the key contributors to Bahrain's GDP [FYI: in 2020, despite of the coronavirus pandemic, the country per-capita GDP, according to the World Bank's estimates (PPP), has exceeded US\$49,406 compared with nearly US\$46,760 in Saudi Arabia and the 2020 global average of US\$17,131] and an employer of choice to many Bahrainis.



Bapco is based roughly in the center of the Bahrain island, in the city of Awali, the 5th-largest Bahraini city (by population), where oil was first discovered and exploited in the region – in 1932 and 1934 respectively.

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Our History

HISTORICAL MILESTONES

- 1929** BAPCO established by Standard Oil Company of California
- 1932** First oil discovery in the Arabian Gulf
- 1934** First shipment of crude oil
- 1936** The Bahrain Refinery – with a capacity of 10,000 barrels per day – opened
- 1945** A-B pipeline laid between Bahrain and Saudi Arabia; then the world's longest commercial submarine pipeline
- 1948** Discovery of natural gas
- 1968** Bahrain Refinery expansion programme completed with 250,000 barrel-a-day capacity
- 1976** Incorporation of the Bahrain National Oil Company (BANOCO)
- 1980** Establishment of Supreme Council for Oil under the chairmanship of H.R.H Prince Khalifa bin Salman Al-Khalifa, the Prime Minister
- 1980** The Petroleum Marketing Unit is set up in the Ministry of Development & Industry with the aim of marketing the Government's 60% share of products from the Bahrain Refinery

Bapco owns a 267,000 b/d refinery – over one-sixth of its crude feed originates from Bahrain while the rest is pumped from Saudi Arabia. Over 85% of Bapco's refined products and crude oil are exported to countries across Africa, the Middle East, the Far East and South East Asia.

How surprisingly it may be, the Bahraini national oil company, BAPCO was founded at the start of 1929 in Canada by Standard Oil Company of California (SOCAL) – for oil exploration activities in Bahrain. At that time, in 1929, it took over Bahrain's assets of the USA's Gulf

Oil corporation and obtained the only oil concession in Bahrain in 1930. On 31 May 1932, the company discovered its first commercial oil at the Bahrain (Awali) field. After exporting oil and constructing a refinery, it started with 10 kb/d refining capacity in 1936. Later that year the Standard Oil Company of California signed an agreement with Texaco, which acquired a half of BAPCO’s shares. In 1975 more than 60% BAPCO’s shares was acquired by the Government of Bahrain. In 1980, all BAPCO’s shares were taken over by the Bahrain’s highest authorities. In 1978 the oil sector of the country was nationalized and BAPCO assumed full control of the national energy sector. In 1999, the current Bahrain Petroleum Company was created, when the Bahrain National Oil Company, established in 1976 and trying to compete with BAPCO, finally merged with it^[7].

Bapco has two subsidiaries: Bahrain Lube Base Oil Company B.S.C. (Closed) (BLBOC) and Bahrain Gasoline Blending W.L.L. (BGB).

BLBOC is a first company of its kind in the region when it was formed in 2009 to build a lube base oil plant manufacturing Group III base oils from the hydrocracker bottoms stream at the Bapco refinery using Chevron Lummus Global ISO Dewaxing Technology along with associated export facilities (see below).

It is a joint venture with three shareholders: nogaholding and Bapco jointly owning 55% while Neste of Finland holding 45% of JV’st equity.

The production capacity of the Lube Base Oil Plant is 400,000 tonnes a year of Very High Viscosity Index (VHVI), Group III Base Oils. These products are in increasingly high demand in Europe and North America, and serve to meet the requirements of the next generation of lubricant performance and environmental standards. Commercial sales by Bapco of its own branded BAPbase® base oils started in January 2018.

BGB is a joint venture formed in 2016 between nogaholding, Bapco and the UK-based Greenergy with a goal of optimising and expanding the domestic gasoline business.

As mentioned above, BAPCO is an integrated oil company operating in the field of refining, and marketing. It operates a 267,000-barrel-per-day oil refinery which lies midway between the original BAPCO expat workers accommodation township of Awali and Sitra. The complex also includes storage facilities for 14 mln bbl, a marketing terminal, and a marine terminal. 95% of the company’s products are for exports (see below). About one-sixth of this crude originates from the Bahrain (awali) field, with the remainder being pumped from Saudi Arabia, which interalia supplies approximately 350,000 b/d through the 112-kilometre (70 mi) pipeline from Aramco’s Abqaiq Plant (see below). Once the flagship Sitra refinery’s expansion is completed in 2023, its capacity will be increased from 267,000 to 380,000 b/d. (see below).



Roads and Car Fueling Stations. According to the London-based CeicData, as of the end of 2020, total length of motor roads and desert “lanes” in Bahrain amounted to 4,210 km compared with 2,010 km at the end of 1991. Out of this, paved roads accounted for 592 km in December of 2020 (less than 14.1%) comparing to 563 km at the end of 2013^[8]. In its turn, the Sofia-based Theodora Consulting, fully trusting the US CIA’s somewhat old data, gives the total length of Bahraini highways at 3,164 km, including paved motor-ways at 2,433 km (76,9%)^[9], with the King Fahd over-sea paved causeway linking Bahrain and Saudi Arabia (see Fig. 3 below).

The first vehicle appeared in Bahrain in 1914. Later the country experienced the continuous increase in the number of cars: from 395 in 1944, to 3,379 in 1954 and to 18,372 cars in 1970^[10].

In 2019 there were 26,372 registered passenger motor vehicles on the roads of Bahrain^[11]. With average permanent inhabitants of a bit more than 1.64 million, the country exploited over 16 passenger cars per 1,000 people, which is much less than the world’s average (some 120 units per 1,000 persons)^[12].

Still, passenger cars sales in Bahrain are expected to reach 36,460 vehicles in 2026. In turn, electric vehicles (EVs) sales are expected to go up to 16,207 vehicles in 2027^[13].



There are only 48 petrol stations plus 3 electric charging points for EVs in Bahrain at present (beginning of 2020), but there were plans to set up five or six petrol stations next year, while it was expected to provide mobile fuel stations in 2020.

Fairly typical of a developing country lacking any infrastructure for alternative-fuel cars that gasoline (mogas) and diesel fuel are main car fuels in Bahrain while na-tural gas, including LNG, as well as CNG and LPG, which is very popular on the roads of SEA and South Asia, ethanol and its mixtures with mogas, widely filling tanks of Brazilian cars, (and not to mention hydrogen) are not now used at all by Bahraini automobilists.



Pipelines. According to the CIA/Theo-dora, total length of hydrocarbon pipelines in Bahrain amounts to 104 km, including 56 km pipelines for crude oil; for petroleum products – 16 km; and for natural gas – 32 km^[9], with the old oil pipeline stretching for 42 km from Dhahran (Saudi Arabia) to Bahrain’s oil refinery at Sitra (Fig. 3).



Figure 3
Location of the A-B Oil Pipeline Between Saudi Arabia and Bahrain

In 2018 BAPCO commissioned a new pipeline that replaced the over 70 years-old pipeline infrastructure between Bahrain and Saudi Arabia.



Saudi Aramco and the Bahrain Petroleum Company announced on October 10, 2018, the successful commissioning of AB-4 pipeline, a new phase of the strategic Saudi Aramco-Bahrain crude oil pipeline to meet the Kingdom of Bahrain’s growing energy demand.

The new pipeline is capable of transporting up to 350 kb/d of crude oil. The thirty inches in diameter and 112 kilometers long AB-4 pipeline originates from Saudi Aramco’s Abqaiq Plants and terminates at the

BAPCO Sirte refinery in Bahrain. The pipeline consists of three segments: a 42-km onshore Saudi segment, 28-km Bahrain onshore segment, and a 42-km offshore segment.

The new pipeline is equipped with the latest technologies to ensure safety, environmental protection and hydrocarbon supply reliability for the next decades. On the other hand, the existing 73 years old pipeline system, which has been supplying BAPCO with crude oil since 1945, will retire safely.



By the way, an offshore section of the old A-B oil pipeline, completed in April 1945, was historically the first offshore pipeline in the waters of the Arabian/Persian Gulf.

“The commissioning of AB-4 pipeline is another chapter in the special relationship between Saudi Aramco and BAPCO in several aspects including the energy sector that has flourished for more than 73 years...”, said Abdullah M. Mansour, Acting Executive Head of Pipelines Distribution & Terminals at Saudi Aramco^[14].



Refineries. BAPCO is an integrated oil company operating in the field of refining, and marketing. It operates a 267,000-b/d oil refinery (Sitra Refinery), which lies midway between the original BAPCO expat workers’ accommodation township of Awali and Sitra and was commissioned in 1936. It is currently the only one working oil refinery in Bahrain.

Roughly 17% of this single refinery’s crude oil originates from the Bahrain (Awali) field, while the bulk of crude oil feedstock is imported from Saudi Arabia^[15].

In March 2019 construction work was started to upgrade the oil refinery at Sitra. The \$5 bln project should increase the capacity to 360,000-380,000 b/d. The following main contractors were chosen for the project:

Spain’s Técnicas Reunidas, US-French Technip and South Korea’s Samsung (EPCC contract);

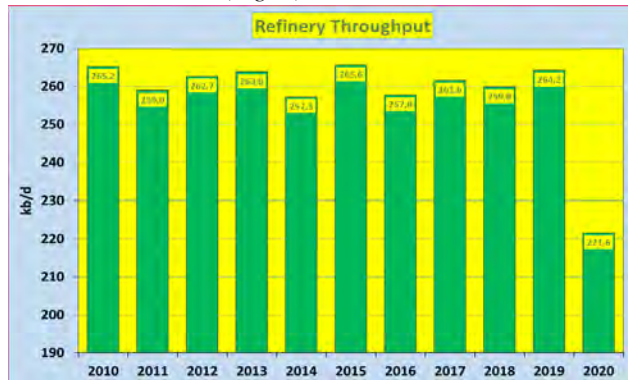
USA-France’s Technip: Front-End Engineering Design (FEED); and US Chevron Lummus Global (Licenses for LC-FINING – Resid Hydrocracker & ISOCRACKING – Hydrocracker).

In 2018 Korea Eximbank provided USD367-mln loan to the refinery’s modernization project in Bahrain.

The Sitra refinery is also home to petrochemical complex run by Gulf Petrochemical Industries Company (GPIC) – a joint venture by several GCC states and owned by the government of Bahrain, Saudi Basic Industries Corporation and Kuwait’s Petro-chemical Industries Company. GPIC uses Bahrain natural gas as feedstock to produce 400,000 tpy of ammonia, 600,000 tpy of urea and 400,000 tpy of methanol.

So, a design intake capacity of the Sitra refinery in Bahrain is 267 kb/d (though BP agrees with 260 kb/d only^[16]). It would have been needless to draw a related diagram for 2010-2020 based on BP’s data as refining capacity in Bahrain shows no change for this period – 260 kb/d.

The other thing is actual refinery throughput or production, which only partly reflects the existing capacity to refine oil and fluctuated in 2010-2019 within a corridor of 257-266 kb/d, before it dropped annually in 2020 – under the impact of the pandemic – by more than 16% – down to 222 kb/d (Fig. 4).



Source: drawn by the author based on <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report>^[16]

Figure 4
Refinery Production in Bahrain in 2010-2020 (according to BP), in kb/d

Consumption of hydrocarbons in Bahrain is dominated by NG, which accounted for nearly 95% of their combined use in 2019 on energy basis.

The kingdom’s consumption of dry natural gas in 2020 was estimated by the US Knoema consultancy at nearly 6450 cubic feet (BCF) compared to reported 644.53 BCF (no change) in 2019 and almost 557 BCF (+ 59.3%) in 2010^[17, 19].

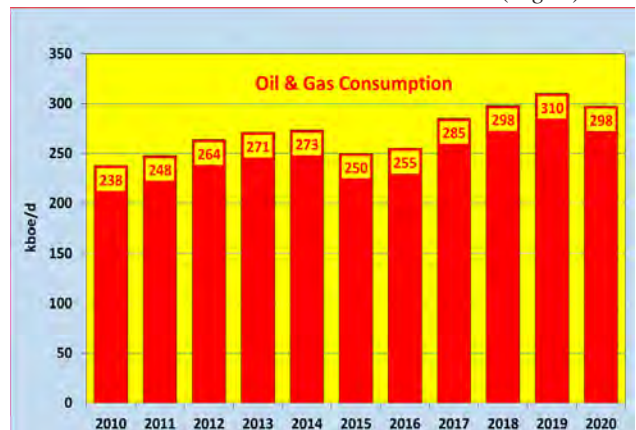
Using the other, SI measurement and according to GAPMER, natural gas consumption in Bahrain grew from 12.8 billion cubic meters in 2010 up to nearly 18.3 bcm in 2019 and has unchanged – despite the coronavirus pandemic drop in energy demand – at the level of a bit more than 18.25 bcm in 2020.

Natural gas fuels all of Bahrain’s power plants. The country’s power sector consumes around 50%, and the industrial sector consumes about 33% of total natural gas demand. Bahrain’s Sitra refinery (*see above*) is also a

major natural gas consumer, accounting for around 10% of the country’s total gas demand^[20].

As for the inland use of oil products, in March 2022, petroleum consumption for Bahrain was 19 kb/d. Though Bahrain petroleum consumption fluctuated substantially in recent months, it tended to decrease through April 2021–March 2022 period, ending at 19 kb/d, and recorded over 40 kb/d in February and less than 30 in January^[18].

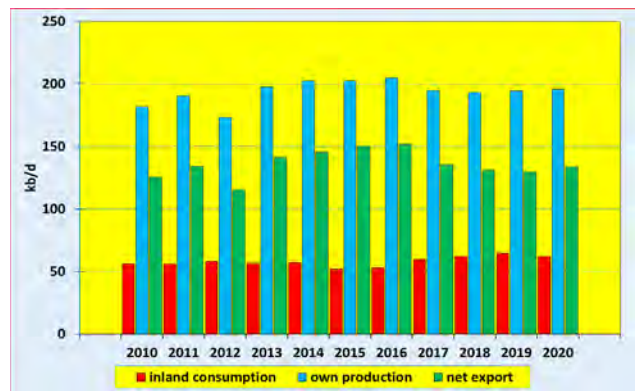
All in all, in line with our (GAPMER) estimates, annual use of hydrocarbons (oil and gas) in Bahrain grew by over 30% in the period of 2011-2019: from 238 kboe/d in 2010 up to 310 kboe/d in 2019 – before it has dropped – under the impact of the coronavirus – by more than 16.1% in 2020: down to less than 298 kboe/d (Fig. 5).



Source: drawn by the author based on estimates of the GAPMER (2022)

Figure 5
Annual Total Oil and Natural Gas Consumption in Bahrain in 2010-2020 (according to GAPMER), in kboe/d

Petroleum Balance. Generally speaking, Bahraini petroleum balance is quite typical of a major oil-exporting country – own production and exports dominate the petroleum picture while inland consumption does not play any significant role (Fig. 6). In 2020 petroleum self-sufficiency of Bahrain was over 315% – not too far away from more than 320% in 2010.



Source: drawn by the author based on sources to the Figs. 1 and 5

Figure 6
Petroleum Balance of Bahrain in 2010-2020 (according to GAPMER), in kb/d

The Covid-19's Impacts and Prospects. The coronavirus pandemic has seriously hit the Bahraini oil and gas market. Annual use of oil products has dropped in 2020 by more than 16.1%. Also, to the same extent had decreased refinery throughput of the country's only oil-refining plant (see above). According to the USA's Market Research, a market value of the Bahraini oil and gas market (with consumption volume increased at a compound annual growth rate (CAGR) of 1.2% between 2016 and 2020 up to 105.6 mln boe in 2020) declined by 36.8% in 2020, with the COVID-19 pandemic depressing demand and leading to the collapse of oil and gas prices^[21].

In line with the recent (June, 2021) report of the Dublin-based consultancy Research and Markets (R&M), market value of the Bahraini petroleum (oil + gas) market reaching a value of over US\$574 mln in 2020 (after declining at a rate of 28.2% over 2019) should grow at a CAGR of 12% in the period of 2021-2025^[21].

We in the GAPMER regard the above forecast of the R&M as somewhat too optimistic and think that the Bahraini petroleum (oil + gas) market will recover to pre-pandemic levels not earlier than in 2023 and expect it will rise in the period of 2023-2030 at a CAGR of no more than 10%. As for Bahrain's oil production, it must not go above 200 kb/d and will remain actually depressed (despite the major discovery m.



Foreign Trade. As it was mentioned earlier, Bahrain started to export crude oil in a couple of years after the first "black gold" field was discovered in the region in 1932.

In 2020, Bahrain exported crude oil for a value of US\$143 mln or over 1.4% of the country's merchandise export bill – exclusively to Japan (100%).



However, crude oil is not the No.1 good exported by the country. It is now refined petroleum. In 2020, Bahrain exported US\$3.19 bln of refined oil products or 31.7% of its total export proceeds (the most exported item) – primarily to the neighboring UAE (over 49%), Japan (more than 7.5%), and South Korea (nearly 6.5%). At the same time, as Bahrain's only oil refinery at Sitra (see above) cannot satisfy total inland petroleum demand, the

country had to import some oil products – in 2020, for a value of US\$176 mln (nearly 1.5% of its merchandise imports) – mainly from the same UAE (almost 72%) and India (nearly 15%)^[22].

Also, since the end of March, 2019, the country exports LNG. In 2020, the gas was the 12th most exported product (nearly 1.4% of the country's all goods exports) in Bahrain. At the same year, chilled liquid gas was exported by the country for a value of US\$139 mln – mainly to India (almost 58%) and Indonesia (nearly 31%)^[22].

Summa summarum, the Covid-19 pandemic has seriously hit the Bahraini oil market (harder than the other sectors of the national economy), however, the pandemic has made inland oil demand and petroleum imports of the kingdom lower but the domestic crude oil production will unlikely increase in the foreseeable future above 200 kb/d, despite the significant discovery of hydrocarbons announced by Bahrain's officials in early 2018.

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